Space Weather Forecast

Issued on Wednesday, 28 September 2022 at 13:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1-G2/Minor-Moderate geomagnetic storms likely to develop from late day 2 (29 Sept) or day 3 (30 Sept) with a chance of G3/Strong. Chance of R1/Minor Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with several C-class flares observed, mostly from two regions located in the southwest quadrant. These are one of four numbered active regions on the visible disc. Three regions are of moderate longitudinal extent, one in the northeast quadrant, and two already mentioned above in the southwest. The new numbered region near the northeast limb remains a single moderate size unipolar spot.
Possible Earth-directed CME was observed 28/0400 UTC, though analysis has not yet been performed due to lack of data.

Solar Wind / Geomagnetic Activity: Solar wind parameters have indicated a combination of high speed stream and coronal mass ejection influences, with the latter appearing to be waning. The solar wind speed declined from elevated to strong levels during the start of the period but remains elevated. The total Interplanetary magnetic field strength started Strong, but has declined back to weak levels. The north-south component followed a similar trend and has stayed mostly positive. Geomagnetic activity was Quiet to Active (Kp 2 to 4) through The last 24hr.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was very slightly raised above normal background levels, but well below the level of a solar radiation storm.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be generally Low, with a chance of isolated Moderate-class flares, primarily from the two regions in the southwest quadrant .

Solar Wind / Geomagnetic Activity: Elevated solar winds speeds are expected to reduce back to slightly elevated levels by day 2 (29th). The next fast streams of solar wind, from returning coronal holes, are then expected to arrive from late day 2 (29th) or day 3 (30th) and continue through the weekend UTC, with strong solar winds likely to develop.
Geomagnetic activity is likely to be mostly Quiet to Unsettled, but with isolated Active intervals still possible into the first half of day 2 (29th). From late day 2 (29th) onward, Minor to Moderate storm intervals expected to develop, with a chance of Strong storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist close to background levels, with a slight chance of an S1 (or greater) solar radiation storm if any notable flares occur, most likely from the regions in the southwest quadrant.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	40	80	70
Strong	G3	No	1	10	50	40
Severe	G4	No	1	1	10	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	25	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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